ABSTRACT

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A photo-ionization detector (PID) includes a microprocessor, a first gas detection unit, and a second gas detection unit. The microprocessor controls the first and second gas detection units such that ambient gas always flows through the ionization chamber of one of the gas detection units while the flow of the ambient gas is closed in the ionization chamber of the other one of the gas detection units. The UV lamp converts oxygen in the closed ambient gas to ozone, which removes contamination in the ionization chamber with the closed ambient gas. When the PID includes only one gas detection unit, the microprocessor controls the gas detection unit such that the flow of the ambient gas in the ionization chamber is intermittently interrupted. A method of real-time self-cleaning and measuring of a volatile gas concentration with the PID includes flowing the ambient gas through the ionization chamber of the first gas detection unit, so that the PID measures the volatile gas concentration, and stopping the ambient gas through the ionization chamber of the second gas detection unit so that the ambient gas is closed in the ionization chamber of the second gas detection unit while the ambient gas flows through the ionization chamber of the first gas detection unit. The UV lamp converts oxygen contained in the ambient gas in the ionization chamber of the second gas detection unit to ozone, which removes contamination in the ionization chamber of the second gas detection unit.